

“WHEN PEOPLE COME TO ME FOR SUGGESTIONS, I FEEL LIKE AN EXPERT”

Empowering women through smartphones in rural Bangladesh

*Anindita Sarker, Monisha Biswas, Misita Anwar, Larry Stillman,
and Gillian Oliver*

11.1 Introduction

Information and communication technology (ICT) is central to the long-term development vision of the government of Bangladesh. However, there are significant, though sometimes unrecognized, gaps in the rhetoric about access to information via ICTs and the realities on the ground in rural Bangladesh. While Bangladesh has a good mobile phone infrastructure and people do have access to mobile phones, there are still widespread, social, cultural, economic, and religious barriers that inhibit the uptake of ICTs by rural women.

This chapter is based on findings from PROTIC (Participatory Research and Ownership with Technology, Information and Change), an ICT for Development project. PROTIC worked to support the socioeconomic inclusion and empowerment of rural Bangladeshi women in agriculture by developing a collaborative smartphone-based information system to support localized agricultural and other farming information (Sarrica et al., 2019).

The purpose of this chapter is to provide insights into the design and implementation priorities of ICT for development initiatives in the context of countries like Bangladesh. In order to provide insight into grassroots perspectives, we will discuss women’s achievements and successes, as well as the challenges faced by them. The following section presents an overview to support understanding of the context and important concepts as the basis for that discussion.

11.2 Understanding the context

This section is divided into three main parts, beginning with the literature relating to women’s empowerment, followed by an explanation of socio-materiality,

and concluding with consideration of ICTs and Sustainable Development Goals (SDGs) in the context of Bangladesh.

11.2.1 Women's empowerment

Empowerment is a very complex and multi-layered process that involves individual discovery and change. Through this gradual forward-moving process, people can stand up for their rights, and help create just, healthy societies (VeneKlasen & Miller, 2002). As a form of power, empowerment can be defined as a “power-to” act. This conceptualization of power emphasizes the capacity or ability, and more specifically, the capacity to empower or transform oneself and others. This is in contrast to what is considered to be a negative “masculinist” conception of power as “power-over”, domination, or control of women (Allen, 2016). However, the existence of “power-over” cannot be understood only as a function of gender (as negative male power). Otherwise, we will not be able to recognize the significant role of traditional power arrangements which involves both genders in the exercise of multiple forms of power. As another form of power, empowerment is the processual understanding of women's empowerment. The processual understanding of empowerment emphasizes the ability to choose (Sen, 1985) which is different from more instrumentalist forms of empowerment. Instrumentalist forms consider the measurement and quantification of empowerment as primary, whereas processual understanding focuses on the socio-structural process by which those who have been denied the ability to make strategic life choices acquire such an ability (Kabeer, 1999).

Kabeer (2005) also highlights the interdependence of individual and structural change in processes of empowerment where structures shape individual resources, agency, and achievements. This highlights circumstances where agents can be required to improvise in structurally constrained ways (Sewell, 1992). Choices define the parameters within which different categories of actors are able to pursue their interests, promoting the voice and agency of some and constraining those of others. In this chapter, the processual understanding of empowerment is important because this approach guides the exploration and understanding of women's achievements as well as the influence of socio-structural factors in the process of empowerment.

11.2.2 Socio-materiality

According to Leonardi, socio-materiality refers to the “enactment of a particular set of activities that meld materiality with institutions, norms, discourses, and all other phenomena we typically define as ‘social’” (Leonardi, 2012, p. 27). Socio-materiality emphasizes two major assumptions: (i) all materiality is associated with social processes and contexts; (ii) all social actions are related to materiality (Leonardi, 2012). According to Orlikowski, “*all* practices are always and everywhere socio-material” (Orlikowski, 2007, p. 1444). Here “materiality” is not

limited to the “physicality”, rather it refers to “the ways that its physical and/or digital materials are arranged into particular forms that endure across differences in place, and the time draws our attention to goes beyond the physical dimension” (Leonardi, 2012, p. 10). He drew a strong connection between the user and technology. Previously Orlikowski also argued that socio-material practices such as mobile communication using Blackberry can influence the norms, expectations of interactions, accountability, and behavioral practices of workers within an organization because of a particular feature of a mobile device (Orlikowski, 2007). A similar view was shared by Leonardi, where he wrote that “people often enact their human agency in response to technology’s material agency” (Leonardi, 2012, p. 17). It is important to understand different aspects of “social” and “material” agency for the design and implementation of any sociotechnical project. The PROTIC project is a good example that explores the qualities of “technological artefacts” and “technology-in-practice” in the context of rural Bangladesh. Members of the PROTIC team have previously also studied the relationship between material objects such as the phone and ideas about the possibilities of technology in the village (Stillman et al., 2020). This chapter adopts the perspective of socio-materiality to provide insight into rural women’s use of smartphones for networking and communication related to economic and social activities in their daily lives and the empowerment process.

11.2.3 ICT4D and SDGs in the context of Bangladesh

With a population of 160 million, poverty eradication is a major and constant challenge for Bangladesh. At present one-fourth of the population, i.e., 46.8 million people, live in poverty and 17.6% of the total live in acute poverty (National Designated Authority, 2010, p. 31). While services and industry are growing, agriculture has remained the predominant sector for employment (40.4%) and ensures livelihood for 24.5 million people¹ who are mostly living in rural areas (Bangladesh Bureau of Statistics, 2016–2017). ICT was included in the development planning and intervention process through the ICT Policy 2009 (Planning Commission, 2010). Since then, Information and Communications Technologies for Development (ICT4D) has been at the center of the long-term policy and budget process of the Government of Bangladesh. Not only the government, but a number of NGOs such as Oxfam have undertaken several development projects and integrated ICT as a part of the national development discourse that has become known as “Digital Bangladesh”. This discourse was well integrated into the National Development Goals aiming to achieve the Sustainable Development Goals (SDGs) by 2030 (National Designated Authority, 2010).

From a policy or research perspective, the non-possession of an advanced ICT such as a smartphone can contribute to a digital divide in society because Internet connectivity, not just mobile phone connectivity, is an indicator of digital capacity (Heeks, 2017). In Bangladesh, people with mobile Internet access avail themselves of different public services through smartphones, such as information

about social welfare schemes, the market price of agricultural products, weather forecasts, helpline services for education, health, agriculture, and finance. Given problems with the poor road infrastructure and service delivery in Bangladesh, mobile Internet connectivity is a boon for breaking down isolation. Consequently, PROTIC considers ownership of mobile Internet as an important means to interconnect the rural women with livelihood opportunities and citizen services offered by the local government. This chapter looks particularly into the experiences of rural women participants of the PROTIC project who were given a smartphone as a means to an increased access to knowledge and resulted in significant positive improvement to their livelihood and empowered them. According to the Bangladesh Telecommunication Regulatory Commission (BTRC),² the total number of mobile phone subscribers in Bangladesh is 161.5 million and Internet subscribers are 102.1 million (BTRC, May 2020). While mobile penetration is high, access to the Internet remains a challenge, and this hinders rural women with low literacy rates from reaching many services.

11.3 The PROTIC project

Oxfam in Bangladesh, in collaboration with the Faculty of Information Technology, Monash University, Australia, designed PROTIC and implemented it with local non-government organizations (NGOs) in rural Bangladesh from 2015 to 2019.³ Oxfam in Bangladesh facilitated the implementation of PROTIC in three different geographical locations: in the southern coast, the northern sandy island, and north-eastern wetland areas, where three local-level NGOs implemented the project in three remote (hard-to-reach) villages.

Taking a Participatory Action Research (PAR) approach to support the incorporation of project learnings into ongoing implementation activities (Barua, 2009; Sarrica et al., 2019; Stillman et al., 2020), PROTIC adopted a multi-stakeholder approach by engaging with individuals and entities at local, national, and international levels, including community organizations, NGOs, local government bodies, universities, research organizations, and telecommunication companies.

PROTIC provided information support to female farmers in agriculture, livestock, and aquaculture via smartphones. As part of the practical implementation, the project distributed the smartphones to 300 women in three villages. Women also received training and regular staff assistance to help them learn and actively use their devices to seek information support. PROTIC designed and delivered different forms of information support via text message (SMS), outbound dialling (OBD), call center, and apps. OBD provided the audio version of the information sent through SMS. The intention of the OBD service was to facilitate participants' understanding of the text messages and also support some participants who could not read written texts. As part of this service, information was provided as audio stories or role plays. Participants could make unlimited calls to a dedicated number to listen to audio stories free of charge. A telecommunications company

worked with Oxfam, NGO partners, and communities in order to develop information content tailored for local requirements.

Research was also an integral component in PROTIC, because it was a project concerned with research innovation. Five doctoral students were recruited to undertake in-depth research on different issues to achieve common goals related to gender and ICTs and development (Khabar et al., 2020). The partnership with multiple stakeholders in PROTIC enabled a wide range of PhD collaborations and knowledge-sharing opportunities.

11.4 Methodology

From a theoretical perspective, PROTIC adopted a “middle of the road” PAR approach. By “middle of the road”, we mean that there was an emphasis on a more limited strategy, engaging women at the grassroots level to learn about mobile phones and information, rather than bringing about more radical changes in the relations of community power as suggested by some authors (Borda, 2006). Such an approach recognized some of the cultural, resource, and political limitations on NGOs in undertaking a strong change-oriented approach in the Bangladeshi environment (Lewis, 2016). The PAR approach consequently enabled and supported PROTIC to be more open to understanding and being responsive to community needs within the project cycle. This approach still supported the incorporation of project learnings in ongoing implementation activities and allowed women’s voices to influence project design, implementation, and networking and advocacy with different stakeholders (Frings-Hessami et al., 2020).

The findings reported in this chapter are based on the data collected from several qualitative studies including PROTIC annual evaluations (2016 and 2018 episodic interviews) and doctoral research. Both the first and second authors took PROTIC as a case study in their doctoral projects. Data-collection methods included interviews, focus group discussions, and observation.

11.5 Key findings

11.5.1 Improved learning and skills

PROTIC trained women farmers on how to use mobile technologies to avail themselves of timely agriculture-related information. After receiving smartphones and training, rural women were able to learn more about exploring new information through a helpline (call and SMS), Google search, social media, and mobile apps. They learned about a variety of topics including the cultivation of different crops, diseases of poultry and livestock, fisheries production, agro-technology, use of pesticides, seed preservation, and how to interpret early warnings of seasonal changes and natural disaster situations.

This new learning helped them to acquire new knowledge and to enhance their skill sets. For example, women became more knowledgeable and conscious about

what they could do, with better ideas about crop rotation, crop quality, and preservation. They learned how to choose the right type and amount of pesticide instead of using generic pest-reduction assumptions. More than half of the women have shared their learning with family and neighbors and contributed to a shared learning process within the community in respective villages. According to a PROTIC woman farmer from the northern village:

My neighbors now come to me for more information on agriculture and early warning update.

Ms F (39)⁴

She was treated as a living “knowledge hub” in her community as her neighbors started to rely on her for day-to-day agricultural information.

11.5.2 Greater participation in livelihood activities

Positive changes were observed in the lives of PROTIC participants. Some innovative women started micro-enterprises where mobile technologies and technical support from PROTIC played an important role. The women were able to connect with the markets and network with local stakeholders and service providers. Mobile technologies helped rural women entrepreneurs to keep records of day-to-day transactions, and to manage communications by phone to maintain the delivery of products and collection of payments. The maize-producer and enterprise group in the northern village found the maize app developed by PROTIC very useful, as maize is a new crop for which they lack traditional knowledge of harvesting and storing. Women farmers with less formal education found the mobile apps with visual contents more useful compared to text or voice-based information.

Rural women in the “*char*” (sandy islands) in the northern part of Bangladesh were particularly interested in using PROTIC support to improve their ongoing livelihood activities like duck- and goat-rearing, and the service saved them precious money, even though the amounts seem paltry by Western standards. They achieved this through contacting public or private poultry and livestock extension services. A woman farmer from a northern village said that:

The PROTIC call centre helped me to save my ducks. Previously it was very hard for me to get a doctor here, usually it took two days and hundreds of taka [1 USD = 80 BDT] on an average to bring a veterinarian.

Ms K (25)

In coastal areas, because of salinity intrusion in the soil, crop and vegetable production was significantly affected. With the information provided by SMS and the call center, women farmers started applying innovative techniques of cultivating crops. The figures below illustrate these changes.

“When people come to me for suggestions”

The woman in Figure 11.1 has converted a small paddy only a couple of cricket pitches long and twice as wide, from being just for one crop of rice a year to five different food sources all year round. Rice, as well as vegetables, in bags on the mud walls that are watered by the rain (the paddy water is too saline), crabs, shrimp, and ducks are produced in this tiny area. Her husband also started working with her and they sell surplus. He is holding a large crab. A frog hangs from a stick – they are fed to the crabs.

Women on sandy islands were also encouraged to grow vegetables on sand with polyethene sheets under the sand as part of the project which resulted in increased production of vegetables. Figure 11.2 shows pumpkin cultivation on sand, which resulted in increased production and income.

11.5.3 Improved communication and networking

PROTIC resulted in improved communication and networking by the women. Women’s ownership of their smartphones and their newly acquired technological skills contributed to their increased use of those phones. Before the project, women’s mobile phone use had been mostly limited to the occasional use of their family members’, relatives’, or, in some cases, neighbors’, mobile phones. According to the baseline data, the highest rate of smartphone use before the project was around 7% in the south. PROTIC distributed smartphones directly to



Figure 11.1 Converting a paddy field into multiple sources of food. (Photo: Larry Stillman).



Figure 11.2 Cultivating pumpkins on sand with polyethene sheets underneath. A plate of garlic also sits there to ward off pests. (Photo: Larry Stillman).

the rural women farmers and the names of these women were recorded as project participants and phone recipients in the project documentation. This was the first time that nearly all of the women had such a valuable device in their own name. The sense of ownership of a personal smartphone contributed to their sense of personal status, and for many, this contributed to their growing practice of using smartphones. They could use the smartphones more independently and frequently as they had more freedom and control over using their own devices compared to having to request them from others.

More independent use of their smartphones and increased technological skills resulted in increased communication: firstly, within the family and with close relatives; secondly, with their communities; and thirdly, and most significantly, with people outside their families, and even communities, including local government extension officers for agriculture, veterinary and fisheries, market actors, NGO staff, doctors, and children's school teachers. The use of the smartphone

“When people come to me for suggestions”

for communicating with people outside their families demonstrated that the women, within cultural limits, had overcome sociocultural restrictions on communicating with those outside the village, particularly men in positions of power. Peer-learning occurred when women asked for support from their comparatively more skilled PROTIC peers, family members, relatives, and neighbors when they encountered difficulties using their smartphones. Their requests also reflected a desire to innovate with technology.

Figure 11.3 shows women’s communication and networking in PROTIC where six different domains for communication and actors involved in each domain were identified. Before PROTIC, women’s communication and networking were mostly limited to Domain (1) Family and relatives and Domain (2) Community. Some of the women also reported their occasional communication with (3) Markets before PROTIC where they had mostly communicated with the vendors coming to their villages or homes selling their products. With PROTIC, it was more convenient for the women to proactively communicate with



Figure 11.3 Women’s communication and networking in PROTIC.⁵

the buyers whenever they needed to sell their crops or goats or poultry in Domain (3), Markets.

Domain (4) Local government and extension services, (5) NGOs, universities, research organizations, and (6) Online communities, were the new dimensions in the women's communication and networking domains. PROTIC directly supported these new domains of communication and networking by designing apps, providing contact details, or engaging stakeholders into various project events. Women became more informed about the services available at the local government office or through the extension officers, and some of them proactively started communicating with the service providers whenever needed. They also took part in project-related events at local and national levels, which also contributed to their communication and networking skills.

However, despite these innovations, which provided the communities with a virtual voice and presence far beyond the confines of the traditional village, engaging stakeholders and getting support from them was not always smooth and this domain needed ongoing attention by the project. As will be outlined in a later section, there was also cultural resistance among the women and their communities to accept and support women's independent use of smartphones and the Internet. Development of this sort is not without sociocultural and political difficulties for all parties, which needs to be considered in the design and implementation of such initiatives.

11.5.4 Increased respect and improved social position

Represented by Domain (1) in Figure 11.3, the use of smartphones helped women to improve their social positioning in their families and among relatives. This new means of communication significantly contributed to their agency and participation in family decision-making. Using their own smartphones enabled convenient communication. Most of the women said they could manage their communication with their birth family and friends more easily whereas previously they had to negotiate permission and the time to visit their relatives and families living outside their home. This could also be costly, and there was sometimes resistance to them leaving their husband and in-laws. One of the women from the southern village said:

Earlier I hardly got a chance to talk to my parents by using my husband's phone as he does not like spending his money talking to my parents. And I could not talk freely in front of him but now I can talk to my parents whenever I want.

Ms A (30)

Women could even communicate with their relatives living abroad by using video-calling apps such as IMO or Viber, whereas earlier, they were unable to make expensive international calls. Proactive communication with family and close relatives contributed to their improved position in both their parental family and their

husband’s family. Increased discussion of family issues with family members and relatives provided women with greater opportunities for exchange of opinions.

Women also started to participate more in the family farming decisions as they were able to contribute the awareness and information they received from the project. As shown in Figure 11.3, women’s innovative farming was supported by their husbands where women brought about visible positive impacts in family farming techniques, livestock rearing, fish culture, and remedies for plant diseases including using fertilizers and pesticides.

Women highlighted that they were able to make decisions regarding their children’s education because they got to know more about their children’s studies by communicating directly with their children’s teachers. Women reported that their husbands also valued their ideas and thoughts more when they were contributing to the family’s income, health, or children’s education by engaging in proactive communication with the outside world (Stillman et al., 2020).

Using smartphones also contributed to earning particular respect from women in the community as shown in Figure 11.3 in Domain (2). Women were able to support the community with information obtained through their smartphones which resulted in increased social respect, status, social inclusion, and women’s leadership at community level. One of the women from the southern village said that she got a new title in the community as “the doctor of goats” as she gained knowledge about treating goat diseases. As women had access to free call-center services and could ask for need-based information, community members (both men and women) started seeking help for their agricultural production and livestock or fish culture.

Women became the active information agents in their communities as well as more active participants in community-level decision-making. In Figure 11.3, Domain (4) represents women’s communication with different stakeholders. They could communicate with the agriculture or fisheries officer or with the Union Parishad (local government) chairman or members. PROTIC developed an app with information about local government support services that they could use.

PROTIC worked to engage local-level actors in project activities, which also helped the women to directly connect with local government and stakeholders. As a result of these collaborations, further research projects were conducted. PROTIC participants actively took part in those projects which enabled new connections and opportunities for them to engage in their own advocacy. These new connections, as represented in Figure 11.3 by Domain (5), significantly contributed to their improved confidence and agency.

Overall, women became more active, confident, and innovative, applying their knowledge and information and bringing positive changes to their lives and communities, which resulted in their improved standing in the family and in society.

11.5.5 Online communication and networking

Apart from offline communication, using smartphones introduced online communication and networking opportunities for women as shown in Figure 11.3,

Domain (5). Online communication enabled wider learning and sharing prospects. Women in PROTIC started using Facebook and were connected to different online networks. Through Facebook, they were also connected with PROTIC peers from different areas whom they did not see face-to-face. Women could help each other in their farming by sharing their own experiences as well as by posting the agricultural and weather-related information they got from the project.

A few women use Facebook messenger in addition to mobile phone calls to connect with buyers to negotiate prices for their products and fix delivery times. One woman who runs a small box-making business for sweet-packing informed us that she used Facebook to advertise her product and used Facebook messenger to negotiate prices and maintain delivery details.⁶ Connecting to social media resulted in increased respect and inclusion in society for the women. Women who were regularly using Facebook said that they got messages in their Facebook account from both known and unknown people who asked for agricultural support. Women said it made them feel like an “expert” and encouraged them to search for and share information to support themselves and others.

11.5.6 Sociocultural, economic, and infrastructural challenges

PROTIC introduced the practices and a culture of using smartphones by women in rural Bangladesh. However, despite such activities and achievements, rural women faced multifaceted challenges in accessing and using their smartphones (Sarker, 2020). The women’s low functional literacy level and lack of familiarity with smartphone affordances were significant challenges at the beginning. According to the baseline data, over 50% of the women were “illiterate” or could only sign their names. Using smartphones for the first time was very challenging for some of them, but they also demonstrated innovation in learning and using their devices. One woman from a southern village described how she saved photos against contacts as she could not read:

Whenever I swap the pages quickly to find contacts or other apps on my phone, my family members ask how could I do this without any literacy! Who will tell them that it needs not only literacy but also intelligence! I saved photos against all the contacts. I don’t need to read.

Ms M (28)

While PROTIC provided the means for the women to participate in online and offline activities to engage in income-generating activities, a theme that emerged from the project was that there were consistent cultural, religious, social, and economic constraints that limited the degree to which they could become independent and innovative. Though PROTIC directly handed over the smartphones to the women, ownership did not ensure their independent access to and use of those devices.

All PROTIC participants said that they had to share their smartphones regularly with their family members and, in some cases, occasionally with extended family members, relatives, and neighbors. These device-sharing practices resulted in women’s limited access to and use of their devices although the degree of sharing varies as some women had more control over sharing than others. However, these practices also compromised women’s privacy as others could access their information, including contacts, photos, and also social media accounts, which increased the risk of misuse of their personal information and of cyberbullying (Sarker, 2020).

This is a significant issue in rural Bangladesh where sharing phones within the family is the norm. For married women, the husband and other male relatives such as father-in-law or brother-in-law thought that it was their responsibility to monitor what women did with their phones in order to protect them. Families were also concerned about cyberbullying, although most of them did not have clear ideas of how it happened but thought that people can “*bodnaam*” (defame) women on the Internet. The widowed mother of a young unmarried participant stated:

My family do not support posting photos online. It has greater risks for the women to be defamed [*“bodnaam”*]. I heard about several incidents from my relatives and they also warned me to be careful.

Ms S (38)

Women were concerned about the risk of behavior that could be negatively perceived resulting in damaging their relationship with their husbands, family members, and being detrimental to their personal reputation. This probably limited the amount and degree of engagement by many participants.

Several women mentioned the lack of proper infrastructure and systems to avail themselves of the benefits of mobile-based technological intervention and services. For example, most of the women farmers in the north did not have access to mains electricity. Some had access to rural electricity supplies but still they experienced regular power outages. As a result, many women had to go to a nearby local market to charge their phone, a service they had to pay for. This could mean having to travel a distance of one to three kilometers or more. In remote rural areas, limited bandwidth and Internet connectivity made it particularly difficult for the women to access and use apps in their smartphones.

11.5.7 The challenge of sustainability

While PROTIC has taken some measures to ensure the sustainability of the project, some aspects of sustainability may have been overlooked. Experience from the project highlights that it is not enough to solely focus on teaching participants how to access information but that the sustainability of the information itself also needs to be considered. The women showed considerable innovation by adopting an analogue format (notebooks) to record information, rather than relying on what

they perceived as more vulnerable digital devices for storage (Frings-Hessami et al., 2020). There were also problems with technological sustainability (including mobile infrastructure availability), which to some extent entwined with the financial aspects of the project. Issues like broken phones (for example, due to extreme climatic conditions) or obsolete equipment required further consideration on their ongoing maintenance and replacement. Considering more durable options with comparable price and ensuring appropriate care of the technology were suggested (Anwar & Frings-Hessami, 2020).

The information provided by the project was found to be useful by participants because it had a direct and visible impact on their food security in particular. Consequently, making sure that the project remains accessible and up-to-date in a way that adds value to the community is paramount to achieving the sustainability of its outcomes. Innovative solutions such as mobile apps at a low cost were considered, making sure that information is available to the wider community.

11.6 Discussion

The preceding sections have canvassed findings that can contribute to a discussion on lessons learned from the PROTIC project's dynamics and processes. While some lessons are empirical and related to the conduct of the project, others will also show how the project experience may provide some insights into theory.

Applying the lens of socio-materiality, we can see that the project interventions and supports were designed in a way that created an environment conducive to allowing women to develop their capabilities, which enabled them to successfully integrate the use of smartphones in their traditional practices. Through women's interactions with the new smartphones, new practices, e.g., in communication and networking, emerge, which consequently encourage community innovation in conducting personal and communal activities. This in turn leads, to some extent, to the sustainability and enhancement of the project outcomes. The recursive pattern of these activities reflects Leonardi's observations on the relationships between technology and human agency (Leonardi, 2012). A newly gained capacity to venture into conducting activities online can lead to more livelihood options such as online business. Increased understanding of information continuity will help ensure the sustainability of information women acquire and find very useful. We also observed that encouraging women farmers to adopt new learning and explore innovative practices may inspire the community to "follow the leader" because of the visible impacts, such as increased crop production and increased income. This synergy between innovators and others helps to sustain the change process; however, this requires a longer-term engagement to create a bigger impact.

The PAR approach for PROTIC was useful for making relevant changes in design and implementation at different stages of the project cycle. The approach allows for devising flexible strategies in helping to mitigate the initial barriers to the program such as illiteracy and other sociocultural challenges. The use of PAR to inform project design has been helpful to uncover not only changes in women's

lives, their situations, and positions in the community, but more importantly, provided observational means to the researchers on the project implementation experiences that assisted in their effort to keep a more open and exploratory research. PAR processes have also transformed the project partner’s (Oxfam) attention to the role of technology and a participatory method in their advocacy work and with the local partner NGOs. It has also had an effect on the Monash researchers’ theoretical and practical considerations.

While community feedback has been limited, the project strategies in having several doctoral researchers, in addition to the project’s “middle of the road” PAR strategy, managed to complement the approach in enabling community voices and engagement with and through technology. The complexity and limitations in the field were noted and considered when working with multi-stakeholders in a multi-level environment where there were different expectations and power dynamics. The experience suggests that PAR in its adopted model is bound to be complex, but, when carefully considered and implemented, it can produce rich data and insights to the project outcomes that provide skills and give a voice to the communities themselves (Sarrica et al., 2019).

PROTIC also offers insights into the sustainability of sociotechnical change processes that scholars suggested “meld materiality with institutions, norms, discourses, and all other phenomena we typically define as ‘social’” (Leonardi, 2012, p. 34). The project experience indicates that new sociotechnical relationships can be established and widened to enhance social, economic, and political capital at the village level via the smartphone. A collaborative partnership among academic institutions, NGOs, private sector and community people is useful for bringing about success and sustaining the changes. In the case of PROTIC, the prior relationship between the local government extension service and the rural women was nominal. Through the project, the role-model participants were acting as a connecting point between the public service providers and the community. This is a significant forward step as it can be seen as a foundation to enhance women’s participation in local and regional economic and political spheres. Their advocacy can result in the government making policy interventions for ICT provision such as Internet connectivity.

As discussed earlier, a smartphone or a technological artifact can influence the user group norms, expectations, and behavioral patterns (Leonardi, 2012; Orlikowski, 2007). Looking back at this ICT4D project, its experiences, and outcomes as a form of socio-material practice, we can see holistically how ICTs (in this case the smartphone) and the women, situated in the village, were integral to the particular form of socio-material practice which emerged. Thus, context and culture matter. However, this statement cannot be taken lightly in the ICT context. Careful attention must be paid to politics, local culture, ways of doing and being, particularly in gendered environments such as those found in Bangladesh (Sarker, 2020). The women were empowered, but were not powerless: the key was to take advantage of their indigenous ways of being. This point is particularly relevant when it comes to explaining which outcomes are considered as intervention

successes and the kinds of challenges that have been iteratively taken into consideration in ICT4D.

Furthermore, ICT4D projects are almost always pervaded with concerns about sustainability, and these too emerged in the project. In this case, sustainability solutions were only revealed toward the end of the project. Socio-material perspectives underscore the fact that although project designers cannot predict or control all contextual complexities, they should be able to adapt to them when they arise. Contextually aware design research such as PAR allows for this adaptation.

Mobile technology offered scope for getting connected with wider knowledge sources useful to rural women. Women's increased confidence in using the technology and finding needed and useful information for themselves and their collectives afforded women an enhanced status in their community. As discussed previously, Kabeer's (2005) proposition that there is an interdependence of individual and structural changes within an empowerment process was apparent in the project outcomes. Women's capabilities in interacting with ICTs have expanded their agency and thus their choices. This is a significant achievement in a society where women's roles are often undermined by tradition and social control. Being newly positioned as information sources, women are altering the information landscape at the village level where information is traditionally sourced from a more-often-than-not male, power-holding authority figure, whether a male family member, a local councilor, or a government official. In PROTIC, the women began to weave a way around these people. In this way, the use of smartphones is not only part of, but also creates new networks in the social structure without engaging in behaviors that were seen as too challenging, but were, in fact, beneficial. The fact that women farmers (PROTIC participants) made a direct connection between possessing a smartphone and such networks and their increased sense of dignity also resulted in better acceptance of their changed social role and status. This has also improved their role in family decision-making.

The processual understanding of empowerment (Kabeer, 1999) was particularly helpful to gain an understanding and analyze PROTIC women's abilities and dynamics to see how they chose to access and use their smartphones in the particular environment in which they lived. Women's social power is still insufficient to change the patriarchal power relationship overall, but some things can be done within these limitations. By using the social processes within their environment, women can take advantage of opportunities to make choices, such as within the boundaries of the family, or the care and maintenance of home, gardens, and animals. These activities do not disrupt the social order but the women get respect and status from them, particularly because they generate food and income. These are practical empowerment exercises in which women become immersed, and which can be advocated to their social peers and others for programs and policies affecting village life (Kabeer, 2005). However, we must remain alert to the constraints that can come to the fore in a traditional environment and to problems that may arise for the safety and security of the women.

11.7 Conclusion

Findings from PROTIC show that information and communication technology (ICT) can play a vital role in bringing rural communities closer to the benefits of new and emerging technologies, though there continue to be social, cultural, economic, and religious barriers that constrain activities. PROTIC experiences showed that any project design needs to take careful account of such sociocultural factors, and participants and partners, in fact, have a duty of care toward participants in such a project not to endanger their well-being. Insights from PROTIC can provide guidelines for government, international and local development organizations, and other stakeholders for the design and implementation of more appropriate and sustainable ICT initiatives for empowering women. This learning can be applied to other similar country contexts particularly where women face social barriers and struggle to create their identity in their families and broader societal sphere. The approach of the PROTIC project of implementing learnings in the project cycle made it innovative and open to responding to community needs.

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Notes

- 1 http://bbs.portal.gov.bd/sites/default/files/files/bbs.portal.gov.bd/page/96220c5a_5763_4628_9494_950862accd8c/QLFS_2015.pdf
- 2 <http://www.btrc.gov.bd/telco/mobile>
- 3 <https://www.monash.edu/it/protic/about>
- 4 To ensure de-identification and confidentiality, identifiers are used to label participants. The first letter of the name of the participants is used as the label with their age.
- 5 Figure 11.3 by Anindita Sarker modifies a model by Larry Stillman which was presented in different discussions and seminars on ICT and development in 2019–2020 at Monash University.
- 6 <https://www.dhakatribune.com/climate-change/2020/01/02/anima-the-sweet-packet-businesswoman>

References

- Allen, A. (2016). Feminist perspectives on power. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Fall 2016 ed.). Retrieved from <https://plato.stanford.edu/archives/fall2016/entries/feminist-power/>
- Anwar, M., & Frings-Hessami, V. (2020, March). Empowering women through access to information: The sustainability of a community informatics project in Bangladesh. In: A. Sundqvist et al. (Eds.), *iConference 2020, Sustainable Digital Communities* (pp. 3–14). LNCS 12051.

- Bangladesh Bureau of Statistics (2017). *Quarterly Labour Force Survey Bangladesh 2015–2016*. Retrieved from http://203.112.218.65:8008/WebTestApplication/userfiles/Image/LatestReports/LFS_2016-17.pdf.
- Barua, B. P. (2009). Participatory research, NGOs, and grassroots development: Challenges in Rural Bangladesh. In: D. Kapoor & S. Jordan (Eds.), *Education, Participatory Action Research, and Social Change* (pp. 239–250). New York: Palgrave Macmillan.
- Borda, O. F. (2006). Participatory (action) research in social theory: Origins and challenges. In: A. Reason & H. Bradbury (Eds.), *Handbook of Action Research: Participative Inquiry and Practice* (pp. 27–37). London: SAGE Publication Ltd.
- Frings-Hessami, V., Sarker, A., Oliver, G., & Anwar, M. (2020). Documentation in a community informatics project. *Journal of Documentation*, 76(2), 552–570.
- Heeks, R. (2017). *Information and Communication Technology for Development (ICT4D)*. London: Routledge.
- Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development & Change*, 30(3), 435–464.
- Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal 1. *Gender & Development*, 13(1), 13–24.
- Khabar, J., Shams, R. A., Sarker, A., Saha, M., & Biswas, M. (2020). Building sustainable digital communities: A five-pronged social-informatics research approach in Bangladesh. *iConference 2020 Proceedings*. Retrieved from <http://hdl.handle.net/2142/106543>.
- Leonardi, P. M. (2012). Materiality, sociomateriality, and socio-technical systems: What do these terms mean? How are they different? Do we need them. In: P. M. Leonardi, B. A. Nardi, & J. Kallinikos (Eds.), *Materiality and Organizing: Social Interaction in a Technological World* (pp. 25–48). Oxford: Oxford University Press.
- Lewis, D. (2016). Non-Governmental organizations and civil society. In: A. Riaz & M. Rahman (Eds.), *Routledge Handbook of Contemporary Bangladesh* (pp. 219–235). London: Routledge.
- National Designated Authority (2010). National sustainable development strategy (NSDS) 2010–2021. Retrieved from <http://nda.erd.gov.bd/en/c/publication/national-sustainable-development-strategy-nsds-2010-2021>.
- Orlikowski, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization Studies*, 28(9), 1435–1448.
- Planning Commission (2010). Outline perspective plan of Bangladesh 2010–2021: Making vision 2021 a reality. Retrieved from https://unctad.org/meetings/en/Contribution/dtl_eWeek2018c03-bangladesh_en.pdf.
- Sarker, A. (2020). ICT for women's empowerment in rural Bangladesh. Monash University. Retrieved from https://bridges.monash.edu/articles/thesis/ICT_for_Women_s_Empowerment_in_Rural_Bangladesh/14538588/1
- Sarrica, M., Denison, T., Stillman, L., Chakraborty, T., & Auvi, P. (2019). “What do others think?” An emic approach to participatory action research in Bangladesh. *AI & Society*, 34(3), 495–508.
- Sen, A. (1985). Well-being, agency and freedom: The Dewey lectures 1984. *The Journal of Philosophy*, 82(4), 169–221.
- Sewell Jr, W. H. (1992). A theory of structure: Duality, agency, and transformation. *American Journal of Sociology*, 98(1), 1–29. <https://doi.org/10.1086/229967>.
- Stillman, L., Sarrica, M., Denison, T., & Sarker, A. (2020). After the smartphone has arrived in the village: How practices and proto-practices emerged in an ICT4D project. In: D.

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- R. Junio & C. Koopman (Eds.), *Evolving Perspectives on ICTs in Global Souths. 11th International Development Informatics Association Conference, IDIA 2020, Macau, China, March 25–27, 2020, Proceedings* <https://doi.org/10.1007/978-3-030-52014-4>.
- VeneKlasen, L., & Miller, V. (2002). Power and empowerment. *PLA Notes*, 43, 39–41 <https://pubs.iied.org/pdfs/G01985.pdf>.